Hydrological Summary for Great Britain

SEPTEMBER 1993

Rainfall

For Britain as a whole, September rainfall was significantly above average but regional contrasts were large. The dry summer in northern Scotland continued into autumn - some localities, including Lerwick, recorded less than half the average September rainfall and water supply difficulties were encountered in the Northern Isles. By contrast much of central, southern and eastern England was exceptionally wet and in most areas cloudy and cool also. A notable dry spell was terminated around the 7th September by the first of a succession of vigorous Atlantic frontal systems - most of which followed a relatively southerly track bringing very unsettled conditions to much of western Europe. Subsequently, weather patterns were dominated by a near-stationary low pressure cell to the south-west of the British Isles - complex frontal systems produced showers or more continuous rain, with some especially wet interludes, on most days well into October. September rainfall totals were more than twice the average in much of lowland England and large areas exceeded their normal autumn (Sept.-Nov.) quota of rainfall in the five and a half weeks ending around the 12 October. Over the summer half-year rainfall in parts of Scotland was below average but most regions in southern Britain, the South-West particularly, were notably wet. In the 12-month timeframe regional rainfall totals are all close to, or above, average and long-term deficiencies are now in rapid decline; the residual regional deficiencies are nowhere greater than 10%.

River Flow

Early September saw the continuation of summer flow recessions in most catchments. Soil moisture deficits were around, or above, average and no early seasonal recovery in lowland runoff (or recharge) rates was anticipated. In the event, soils wetted-up very briskly through the month and by early October catchments were saturated over considerable areas. Localised flooding, with considerable transport disruption, at the end of September heralded much more widespread spate conditions - with significant flooding in eastern and southern Britain - over the ensuing fortnight. Increases in flows through the month were markedly quicker in responsive impervious catchments than in spring-fed rivers but by month-end healthy flows were reported for almost all index sites. The Rivers Leven and Derwent (Yorkshire) were among those registering new maximum September runoff totals. Conversely, September minima were established on the Carron and Ewe in northern Scotland. Runoff totals for the last three months are significantly below average in much of Scotland, further accentuating the tendency towards increased seasonal contrasts in recent years, but close to, or a little above, average throughout England and Wales. In the water-year timeframe, runoff totals are also well within the normal range.

Groundwater

September began with a continuation of the summer decline in water-tables but thereafter weather and soil conditions became increasingly conducive to substantial infiltration. By early October, an early, and commonly brisk, beginning to the seasonal recovery in recharge rates was underway in most regions areas. The rapid upturn in infiltration rates is under-represented in the groundwater hydrographs featured on Figure 2 - a reflection both of the intervals between level measurements and the lag between surface infiltration and the eventual water-table recovery, this may be many weeks in the deeper Chalk wells. A steep rise in groundwater levels has already been registered in the Carboniferous Limestone and upturns can be recognised in much of the Permo-Triassic sandstone aquifers. Generally, early autumn levels are well within the normal range in all outcrop areas. The magnitude and persistence of recent rainfall clearly indicates that a repetition of the steep autumn recoveries in 1992 may be expected. This together with the potential length of the winter recharge season - up to six months even in the lowlands - makes for a very encouraging water resources outlook.

General

Runoff and aquifer recharge rates are climbing rapidly and reservoir contents are generally very healthy. In much of the Britain the focus of hydrological concern over the coming winter - given rainfall within the normal range - is likely to be the risk of flooding rather than the return of drought conditions.

Institute of Hydrology

British Geological Survey

Data for this report have been provided principally by the regional divisions of the National Rivers Authority* in England and Wales, the River Purification Boards in Scotland and by the Meteorological Office. Reservoir contents information has been supplied by the Water Services Companies, the NRA or, in Scotland, the Lothians Regional Council. The most recent areal rainfall figures are derived from a restricted network of raingauges (particularly in Scotland) and a proportion of the river flow data is of a provisional nature.

A map (Figure 3) is provided to assist in the location of the principal monitoring sites.

Financial support towards the production of the Hydrological Summaries is given by the Department of the Environment and the National Rivers Authority.

The Hydrological Summaries are available on annual subscription at a current cost of £48 per year - enquiries should be directed to the National Water Archive Office at the address below. No charge is made to those organisations providing data for the Summaries.

13 October 1993

* For reasons of consistency, the original ten regional divisions of the NRA have been retained for use in the Hydrological Summaries.

Dick Monkhouse, who since the inception of the Hydrological Summaries has provided most of the hydrogeological input to the monthly reports, retired in September. His knowledge and expertise will be greatly missed. Andrew McKenzie (Ext 2295) has filled the breach as National Groundwater Level Archive manager; Prem Doorgakant will continue to organise the collection and archiving of the data required for the monthly reports.

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TABLE 1 1992/93 RAINFALL AS A PERCENTAGE OF THE 1961-90 AVERAGE

		Sept 1992	Oct	Nov	Dec	Jan 1993	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
England and Wales	mm	92	84	138	83	98	15	27	96	86	68	80	58	111
	%	119	99	153	88	111	24	38	160	134	105	129	77	144
NRA REGIONS														
North West	mm	110	121	172	118	152	22	32	116	131	69	99	95	105
	%	96	95	140	95	126	28	34	163	175	85	116	89	91
Northumbria	mm	95	81	100	71	108	17	28	120	118	38	57	79	85
	%	130	107	116	88	129	29	40	214	190	63	88	98	116
Severn-Trent	mm	74	71	113	61	81	10	15	78	84	75	77	51	96
	%	116	111	159	79	116	19	25	142	142	127	145	76	150
Yorkshire	mm	95	77	102	71	84	22	14	102	82	49	67	87	127
	%	140	105	128	86	106	38	21	173	137	82	114	118	186
Anglian	mm	86	73	83	41	57	17	17	71	52	49	69	46	105
	%	176	143	143	75	114	46	36	154	108	96	141	83	214
Thames	mm	93	73	117	58	85	6	23	83	61	57	56	35	102
	%	158	118	180	83	133	13	41	166	109	104	114	61	172
Southern	mm	70	86	141	76	94	9	30	91	58	53	62	37	119
	%	101	108	166	93	118	17	48	172	107	98	129	64	173
Wessex	mm	85	52	152	86	117	7	43	82	62	69	67	33	119
	%	118	66	183	92	134	11	61	155	102	121	129	50	165
South West	mm	93	96	216	122	171	22	33	98	131	109	128	39	168
	%	100	83	173	88	124	22	33	142	182	158	186	46	181
Welsh	mm	114	102	214	145	197	23	34	107	124	97	101	73	119
	%	99	74	151	95	138	24	32	134	151	123	131	72	103
Scotland	mm	177	123	212	159	291	67	91	128	111	75	112	87	81
	%	125	79	140	105	193	66	73	168	129	87	119	74	57
RIVER PURIFICATION BOARDS														
Highland	mm	214	155	280	239	358	86	151	86	93	85	141	91	76
	%	125	78	138	121	190	68	93	95	101	87	133	72	45
North-East	mm	107	110	93	78	152	41	55	68	109	59	80	63	63
	%	123	113	94	84	154	63	71	113	158	89	110	72	73
Tay	mm	160	70	163	113	319	32	113	135	132	59	87	73	83
	%	140	54	135	89	222	34	104	218	159	81	113	77	73
Forth	mm	166	66	153	84	247	42	188	108	119	73	74	67	84
	%	151	57	137	76	209	53	194	183	161	106	99	71	76
Tweed	mm	118	77	135	82	158	21	41	124	130	62	54	49	84
	%	133	81	145	88	158	31	52	218	183	95	74	56	94
Solway	mm	155	116	203	133	207	13	103	163	139	70	101	70	104
	%	108	74	141	90	133	13	88	212	164	83	112	59	73
Clyde	mm	205	133	255	165	339	18	161	158	119	77	135	89	105
	%	115	69	142	92	179	15	110	188	131	83	124	67	59

Note: The monthly rainfall figures for August and September correspond to the MORECS areal assessments derived by the Meteorological Office. In northern Britain these initial assessments may have a wide error band associated with them. The provisional figures for England and Wales and for Scotland are derived using a different raingauge network. Regional areal rainfall figures are regularly updated (normally one or two months in arrears) using figures derived from a far denser raingauge network.

TABLE 2 RAINFALL RETURN PERIOD ESTIMATES

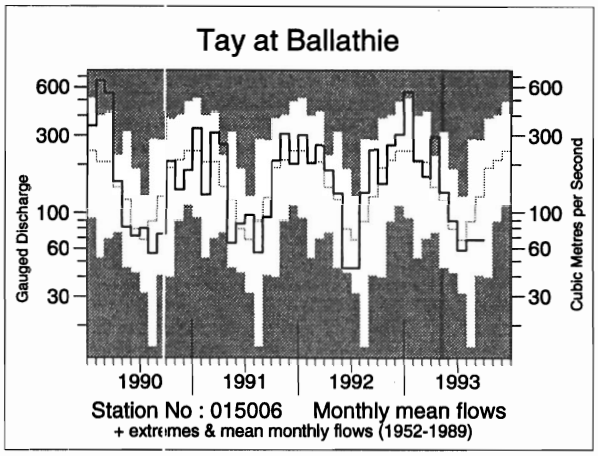
		Apr-Sep93		Oct92-Sep93		Mar90-Sep93		Aug88-Sep93	
		Est Return Period, years		Est Return Period, years		Est Return Period, years		Est Return Period, years	
England and Wales	mm	499		944		2941		4363	
	% LTA	123	5-15	105	2-5	93	5-10	94	5-10
NRA REGIONS									
North West	mm	615		1232		4036		6062	
	% LTA	115	5	102	2-5	95	2-5	97	2-5
Northumbria	mm	497		902		2921		4137	
	% LTA	125	5-15	106	2-5	96	2-5	94	5-10
Severn-Trent	mm	460		811		2531		3720	
	% LTA	129	10-20	108	2-5	94	2-5	95	2-5
Yorkshire	mm	514		884		2692		3918	
	% LTA	135	20-30	108	2-5	92	5-10	92	5-15
Anglian	mm	392		680		2003		2860	
	% LTA	131	10-20	114	5-10	94	5	93	5-10
Thames	mm	394		756		2252		3312	
	% LTA	120	5-10	110	2-5	92	5-10	93	5-10
Southern	mm	420		856		2499		3650	
	% LTA	125	5-10	110	2-5	91	5-10	91	5-15
Wessex	mm	432		889		2674		4051	
	% LTA	120	5-10	106	2-5	91	5-10	94	5-10
South West	mm	673		1333		3858		5863	
	% LTA	147	50-80	113	5-10	95	2-5	97	2-5
Welsh	mm	620		1335		4326		6583	
	% LTA	116	5	102	2-5	94	2-5	97	2-5
Scotland	mm	594		1537		5621		8401	
	% LTA	99	2-5	107	2-5	112	40-60	113	150-250
RIVER PURIFICATION BOARDS									
Highland	mm	572		1841		6957		10493	
	% LTA	84	5-10	105	2-5	114	40-70	115	>200
North-East	mm	442		971		3400		4851	
	% LTA	100	2	100	2	99	2-5	96	2-5
Tay	mm	569		1379		4661		7025	
	% LTA	113	2-5	112	5-10	108	5-10	111	15-25
Forth	mm	525		1205		4235		6272	
	% LTA	109	2-5	109	2-5	108	5-15	109	15-25
Tweed	mm	503		1017		3546		5067	
	% LTA	113	2-5	105	2-5	103	2-5	101	2-5
Solway	mm	647		1422		5144		7723	
	% LTA	108	2-5	100	2	103	2-5	105	5
Clyde	mm	684		1755		6770		10140	
	% LTA	99	2	103	2-5	114	60-90	115	>200

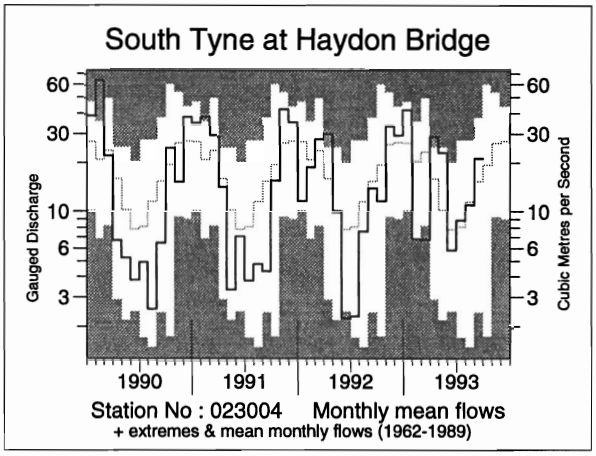
LTA refers to the period 1961-90.

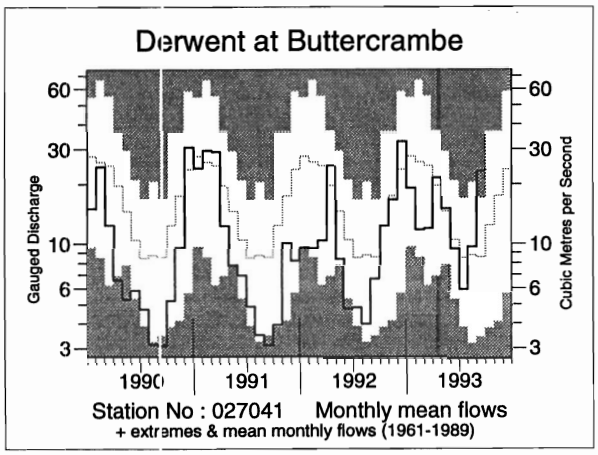
Return period assessments are based on tables provided by the Meteorological Office*. The tables reflect rainfall totals over the period 1911-70 only and the estimate assumes a sensibly stable climate. They assume a start in a specified month; return periods for a start in any month may be expected to be an order of magnitude less - for the longest durations the return period estimates converge. "Wet" return periods underlined.

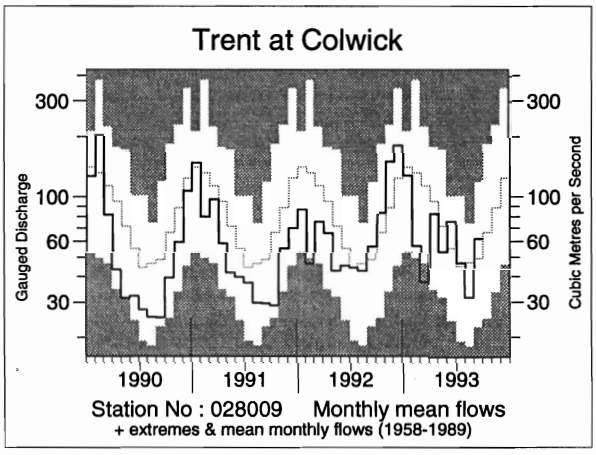
* Tabony, R.C., 1977, The Variability of long duration rainfall over Great Britain, Scientific Paper No. 37, Meteorological Office.

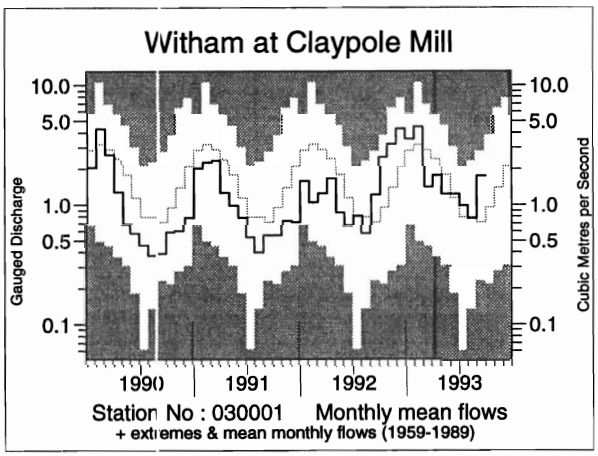
FIGURE 1 MONTHLY RIVER FLOW HYDROGRAPHS

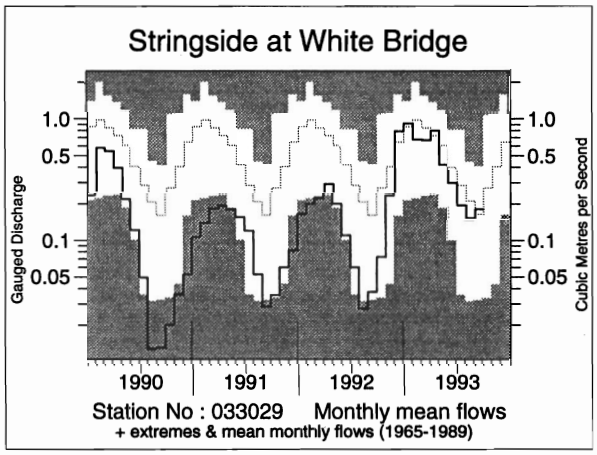


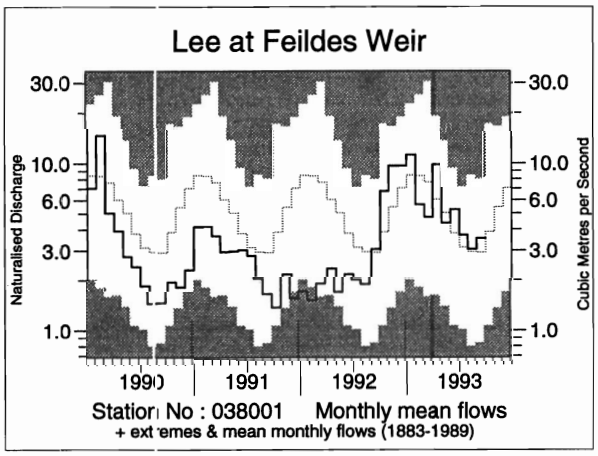


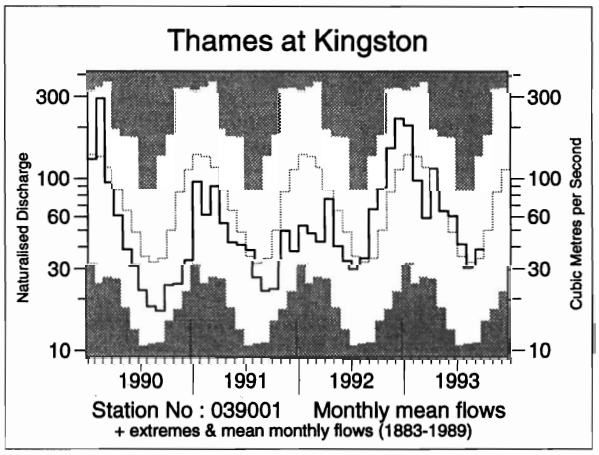


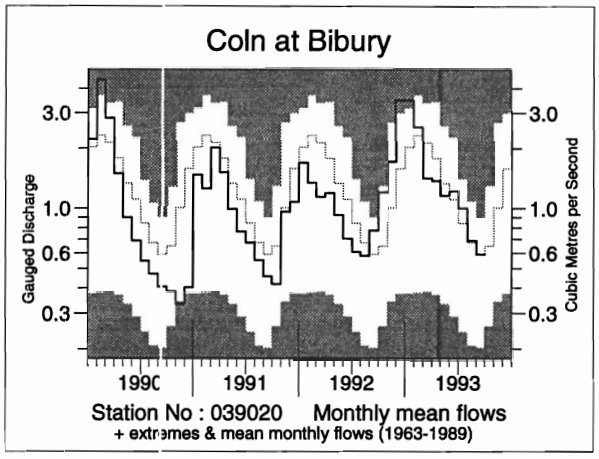


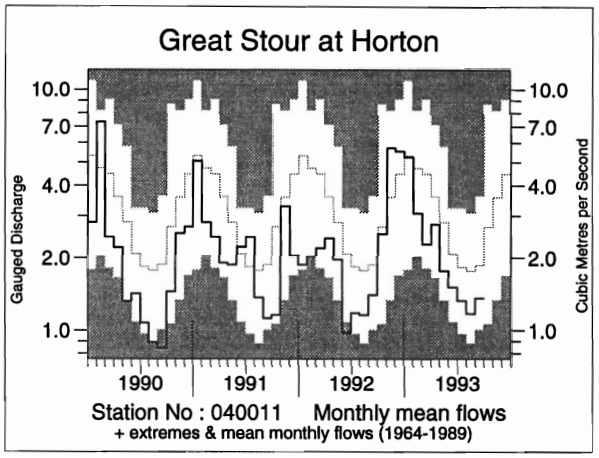


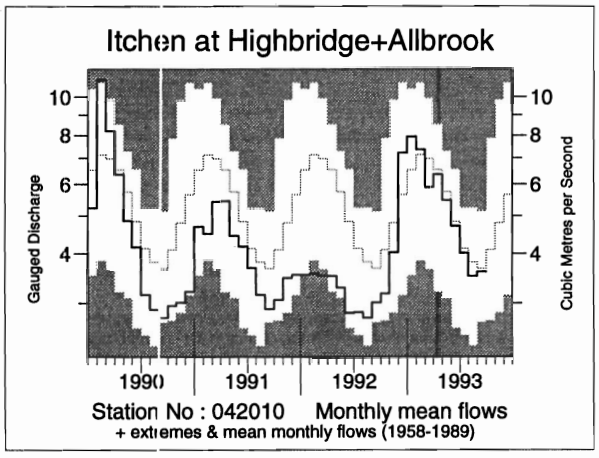


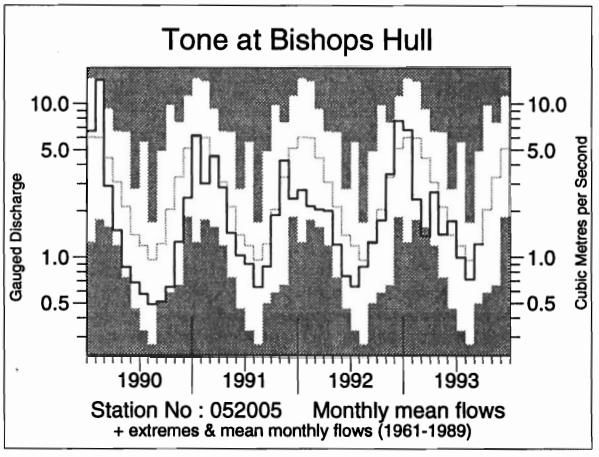





Coln at Bibury
Gauged Discharge
Cubic Metres per Second
3.0
1.0
0.6
0.3
1990
1991
1992
1993
Station No : 039020 Monthly mean flows
+ extremes & mean monthly flows (1963-1989)


Great Stour at Horton
Gauged Discharge
Cubic Metres per Second
10.0
7.0
4.0
2.0
1.0
1990
1991
1992
1993
Station No : 040011 Monthly mean flows
+ extremes & mean monthly flows (1964-1989)


Itchen at Highbridge+Allbrook
Gauged Discharge
Cubic Metres per Second
10
8
6
4
1990
1991
1992
1993
Station No : 042010 Monthly mean flows
+ extremes & mean monthly flows (1958-1989)


Tone at Bishops Hull
Gauged Discharge
Cubic Metres per Second
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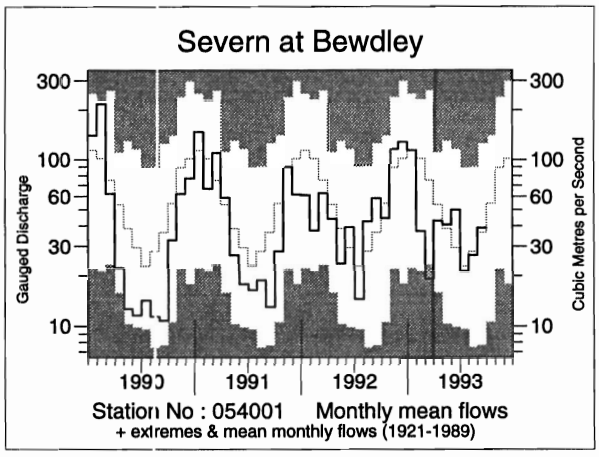
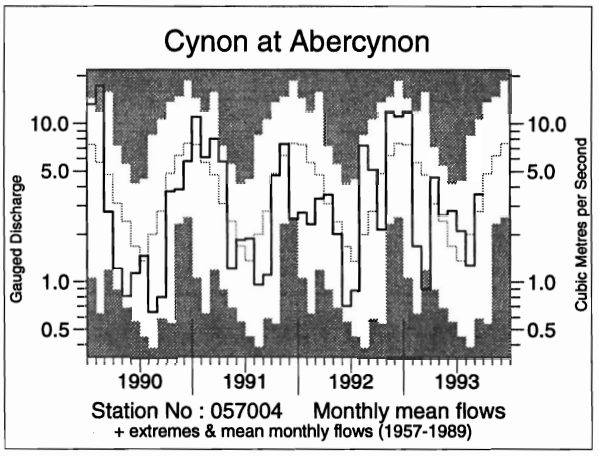
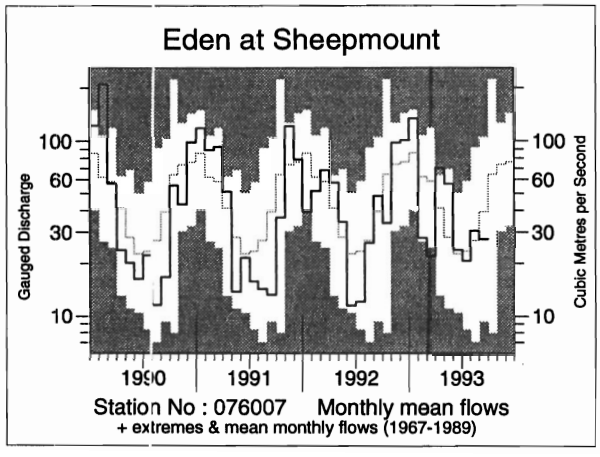
5.0
1.0
0.5
1990
1991
1992
1993
Station No : 052005 Monthly mean flows
+ extremes & mean monthly flows (1961-1989)


Severn at Bewdley
Gauged Discharge
Cubic Metres per Second
300
100
60
30
10
1990
1991
1992
1993
Station No : 054001 Monthly mean flows
+ extremes & mean monthly flows (1921-1989)


Cynon at Abercynon
Gauged Discharge
Cubic Metres per Second
10.0
5.0
1.0
0.5
1990
1991
1992
1993
Station No : 057004 Monthly mean flows
+ extremes & mean monthly flows (1957-1989)


Eden at Sheepmount
Gauged Discharge
Cubic Metres per Second
100
60
30
10
1990
1991
1992
1993
Station No : 076007 Monthly mean flows
+ extremes & mean monthly flows (1967-1989)

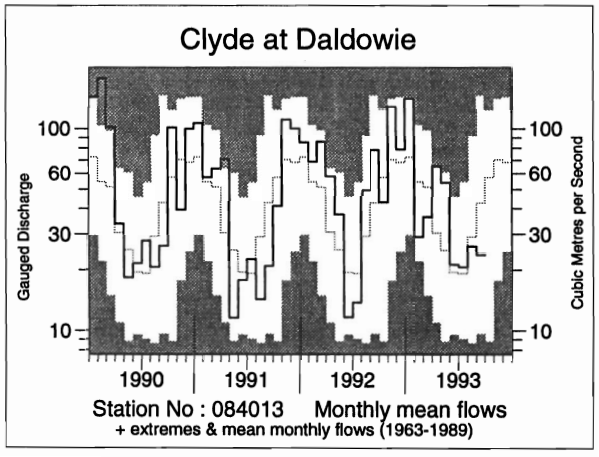

Clyde at Daldowie
Gauged Discharge
Cubic Metres per Second
100
60
30
10
1990
1991
1992
1993
Station No : 084013 Monthly mean flows
+ extremes & mean monthly flows (1963-1989)

TABLE 3 RUNOFF AS MM. AND AS A PERCENTAGE OF THE PERIOD OF RECORD AVERAGE WITH SELECTED PERIODS RANKED IN THE RECORD

River/ Station name	May	Jun	Jul	Aug	Sep		4/93 to 9/93		10/92 to 9/93		5/90 to 9/93		11/88 to 9/93	
				1993	1993									
	mm %LT	mm %LT	mm %LT	mm %LT	mm %LT	rank /yrs	mm %LT	rank /yrs	mm %LT	rank /yrs	mm %LT	rank /yrs	mm %LT	rank /yrs
Dee at Park	87 142	33 90	23 82	24 75	50 122	16 /21	314 113	16 /21	840 106	13 /20	2393 93	6 /18	3427 88	2 /17
Tay at Ballathie	80 116	50 112	34 85	40 77	38 53	7 /41	410 113	31 /41	1360 121	37 /41	4014 109	29 /38	6420 116	34 /37
Whiteadder Water at Hutton Castle	63 241	22 132	11 88	8 53	13 83	14 /25	167 132	19 /24	380 97	11 /24	1187 94	8 /21	1532 78	5 /20
South Tyne at Haydon Bridge	84 241	20 76	32 116	39 101	73 145	25 /30	350 149	26 /30	813 108	22 /30	2427 97	10 /24	3538 94	5 /22
Wharfe at Flint Mill Weir	63 169	27 110	27 103	42 106	79 180	36 /38	297 131	33 /38	726 101	23 /38	2081 89	9 /35	3115 88	3 /34
Derwent at Buttercrambe	25 107	15 91	10 72	16 115	38 285	32 /32	141 124	26 /32	315 97	16 /32	801 75	3 /29	1105 67	1 /28
Trent at Colwick	19 77	27 144	17 107	12 73	21 126	28 /35	124 100	19 /35	349 99	20 /35	905 78	3 /32	1400 80	2 /31
Lud at Louth	17 66	16 83	11 71	9 69	11 102	16 /26	83 73	8 /25	198 79	9 /25	425 52	2 /22	660 53	1 /21
Witham at Claypole Mill	11 72	11 115	9 129	7 103	15 239	34 /35	68 103	20 /34	240 131	24 /34	482 81	8 /32	710 78	5 /30
Stringside at White Bridge	11 72	8 78	5 70	4 76	5 128	22 /28	55 93	13 /27	144 92	12 /27	231 48	3 /22	349 47	1 /21
Colne at Lexden	6 70	6 113	3 72	3 75	5 115	27 /34	34 86	12 /34	149 111	23 /34	295 69	3 /31	492 74	1 /30
Lee at Feildes Weir (natr.)	11 86	13 138	10 124	8 106	9 125	85 /108	75 126	84 /107	196 121	76 /107	366 69	11 /102	598 75	11 /99
Thames at Kingston (natr.)	17 98	16 127	11 116	8 91	10 112	83 /111	93 117	78 /111	312 127	86 /110	634 80	22 /108	997 82	14 /106
Coln at Bibury	29 89	30 115	25 121	17 102	14 99	15 /30	149 98	15 /30	490 125	28 /30	1114 86	8 /27	1684 86	4 /26
Great Stour at Horton	14 67	11 72	10 71	9 68	10 74	7 /29	75 74	4 /27	261 91	11 /26	681 72	3 /22	991 69	1 /18
Itchen at Highbridge+Allbrook	41 98	34 100	30 100	26 94	26 100	18 /35	202 98	13 /35	461 101	20 /35	1224 80	2 /32	1825 81	1 /31
Piddle at Baggs Mill	29 92	23 100	18 101	15 97	19 126	25 /30	143 99	15 /30	444 112	19 /29	1094 83	6 /24	1659 82	3 /21
Exe at Thorverton	26 70	36 154	26 125	22 78	40 104	27 /38	202 100	18 /37	863 105	25 /37	2303 88	7 /35	3488 86	2 /33
Taw at Umberleigh	27 93	73 471	32 211	19 102	39 163	31 /35	226 152	33 /35	746 109	23 /35	1903 88	6 /32	2970 88	2 /31
Tone at Bishops Hull	19 71	22 128	13 86	9 74	16 106	25 /33	113 91	13 /33	419 90	10 /32	1082 72	1 /30	1828 78	1 /28
Severn at Bewdley	25 107	30 172	13 93	16 93	23 106	50 /73	134 106	44 /73	413 92	29 /72	1187 82	9 /70	1886 85	4 /68
Cynon at Abercynon	67 115	69 173	53 155	32 61	88 128	2 /35	423 127	27 /35	1408 113	25 /35	3858 96	13 /29	6058 99	14 /27
Dee at New Inn	139 211	88 153	72 110	105 113	83 63	8 /25	625 117	18 /24	1622 91	7 /24	5125 88	1 /21	7892 89	1 /20
Eden at Sheepmount	66 205	27 109	24 91	36 120	31 73	11 /23	264 128	19 /23	744 107	16 /22	2238 101	9 /17	3417 102	7 /14
Clyde at Daldowie	76 218	29 111	29 107	37 91	32 55	9 /30	292 125	26 /30	923 119	24 /30	2971 118	26 /27	4436 118	26 /26
Carron at New Kelso	61 61	85 117	229 198	131 76	36 13	1 /15	637 74	2 /15	2701 104	10 /14	8915 105	9 /12	14086 112	10 /10

Notes:
(i) Values based on gauged flow data unless flagged (natr.), when naturalised data have been used.
(ii) Values are ranked so that lowest runoff as rank 1.
(iii) %LT means percentage of long term average from the start of the record to 1992. For the long periods (at the right of this table), the end date for the long term is 1993.

TABLE 4 START-MONTH RESERVOIR STORAGES UP TO OCTOBER 1993

Area	Reservoir (R)/ Group (G)		Capacity● (Ml)	1993 May	June	July	Aug	Sep	Oct	1992 Oct
North West	Northern Command Zone[1]	(G)	133375	91	92	77	66	58	51	66
	Vyrnwy	(R)	55146	87	94	89	81	79	73	93
Northumbria	Teesdale[2]	(G)	87936	95	96	80	72	66	73	68
	Kielder	(R)	199175*	91*	96*	91*	90*	87*	84*	87*
Severn-Trent	Clywedog	(R)	44922	95	100	96	94	92	87	92
	Derwent Valley[3]	(G)	39525	81	72	76	77	76	84	62
Yorkshire	Washburn[4]	(G)	22035	91	94	81	72	63	67	64
	Bradford supply[5]	(G)	41407	83	91	80	74	74	90	65
Anglian	Grafham	(R)	58707	93	95	95	96	95	95	94
	Rutland	(R)	130061	94	93	96	93	90	86	93
Thames	London[6]	(G)	206232	95	96	94	96	87	86	94
	Farmoor [7]	(G)	13843	99	98	98	98	98	93	99
Southern	Bewl	(R)	28170	97	96	91	85	78	74	68
	Ardingly	(R)	4685	100	100	99	90	80	77	79
Wessex	Clatworthy	(R)	5364*	86	86	91	82	72	61	40*
	Bristol W [8]	(G)	38666*	89*	84*	76*	67*	60*	48*	65*
South West	Colliford	(R)	28540	83	84	87	86	81	84	65
	Roadford	(R)	34500	78	78	82	81	74	76	72
	Wimbleball[9]	(R)	21320	92	89	89	83	76	74	50
	Stithians	(R)	5205	83	91	99	91	85	93	63
Welsh	Celyn + Brenig	(G)	131155	95	99	100	98	94	92	93
	Brianne	(R)	62140	99	100	98	97	92	91	99
	Big Five[10]	(G)	69762	89	92	89	86	78	80	86
	Elan Valley[11]	(G)	99106	98	100	97	96	97	97	100
Lothian	Edinburgh/Mid Lothian	(G)	97639	99	99	96	89	83	81	92
	West Lothian	(G)	5613	100	99	99	89	81	87	82
	East Lothian	(G)	10206	100	100	99	92	81	85	78

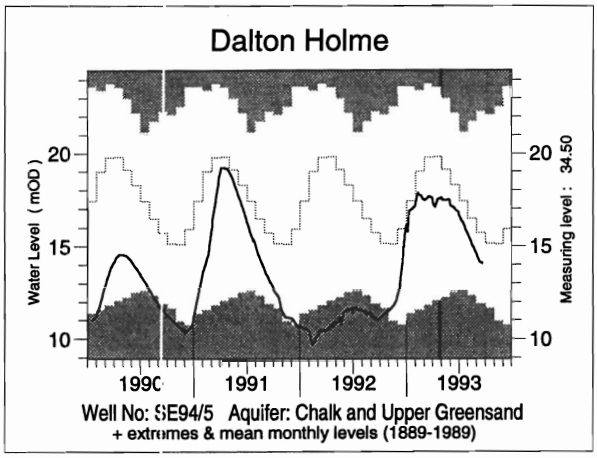
● Live or usable capacity (unless indicated otherwise)

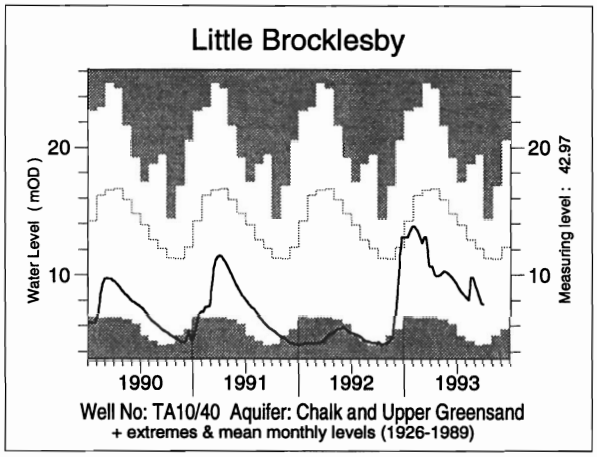
* Gross storage/percentage of gross storage

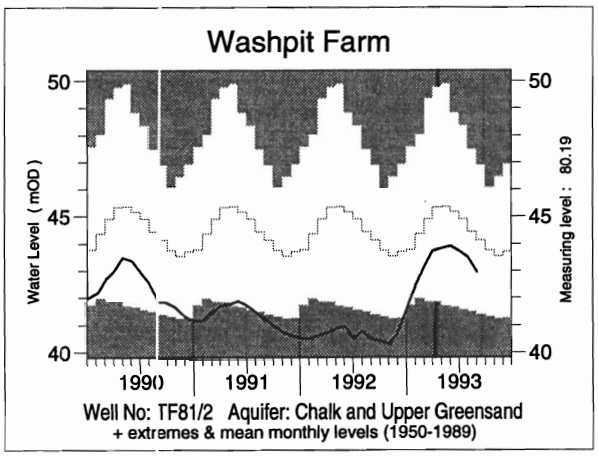
1. Includes Haweswater, Thirlmere, Stocks and Barnacre.
2. Cow Green, Selset, Grassholme, Balderhead, Blackton and Hury.
3. Howden, Derwent and Ladybower.
4. Swinsty, Fewston, Thruscross and Eccup.
5. The Nidd/Barden group (Scar House, Angram, Upper Barden, Lower Barden and Chelker) plus Grimwith.
6. Lower Thames (includes Queen Mother, Wraysbury, Queen Mary, King George VI and Queen Elizabeth II) and Lee Valley (includes King George and William Girling) groups - pumped storages.
7. Farmoor 1 and 2 - pumped storages.
8. Blagdon, Chew Valley and others.
9. Shared between South West (river regulation for abstraction) and Wessex (direct supply).
10. Usk, Talybont, Llandegfedd (pumped storage), Taf Fechan, Taf Fawr.
11. Claerwen, Caban Coch, Pen y Garreg and Craig Goch.

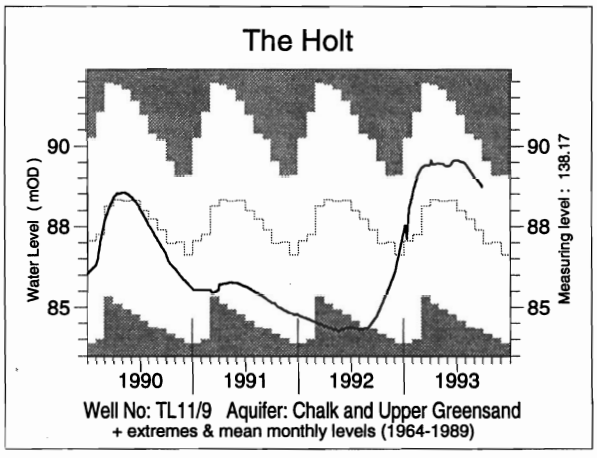
Note: Variations in storage depend on the balance between inputs (from catchment rainfall and any pumping) and outputs (to supply, compensation flow, HEP, amenity). There will be additional losses due to evaporation, especially in the summer months. Operational strategies for making the most efficient use of water stocks will further affect reservoir storages. Table 4 provides a link between the hydrological conditions described elsewhere in the report and the water resources situation.

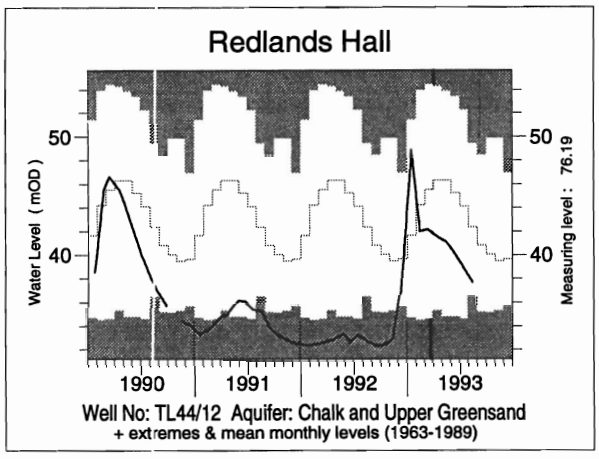
FIGURE 2 GROUNDWATER LEVEL HYDROGRAPHS

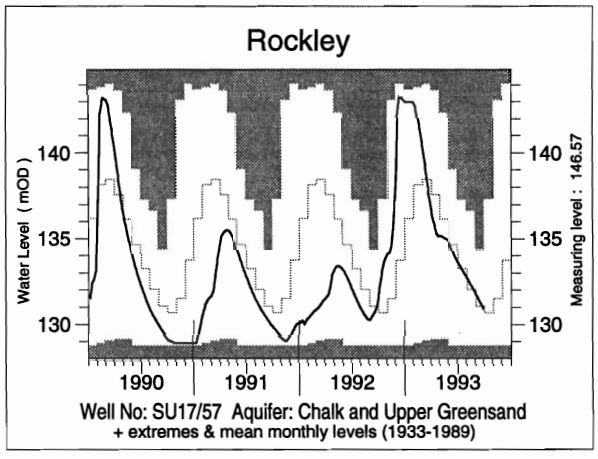


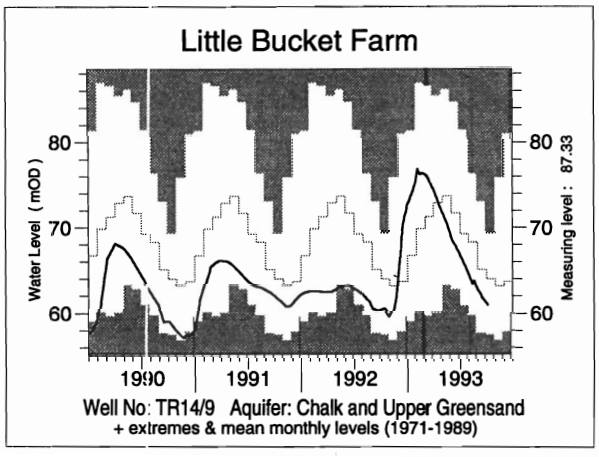


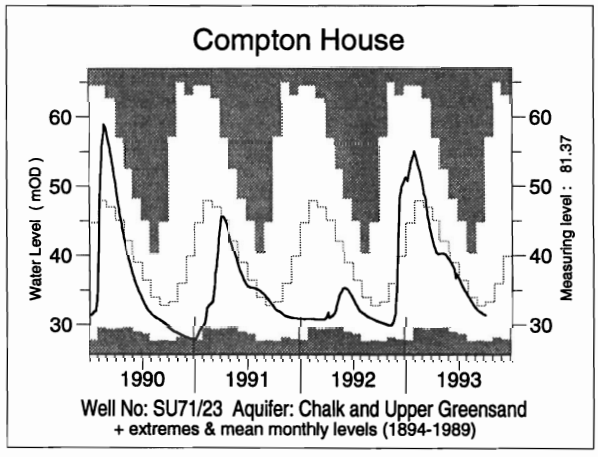


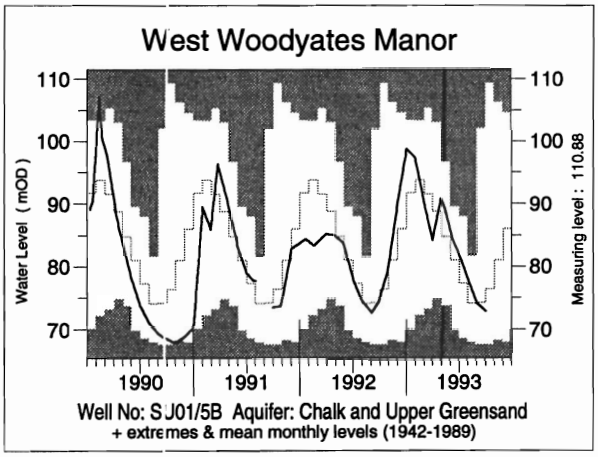


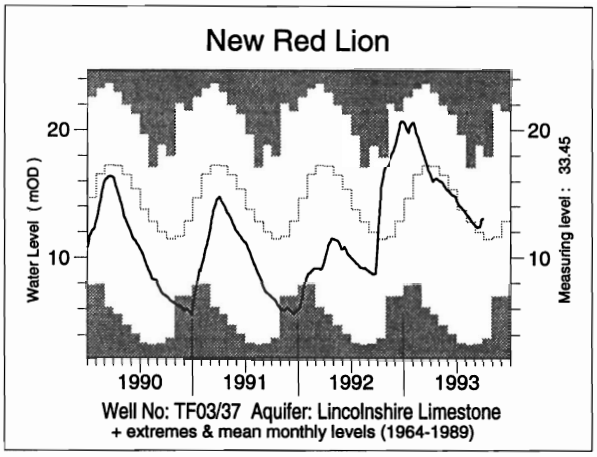


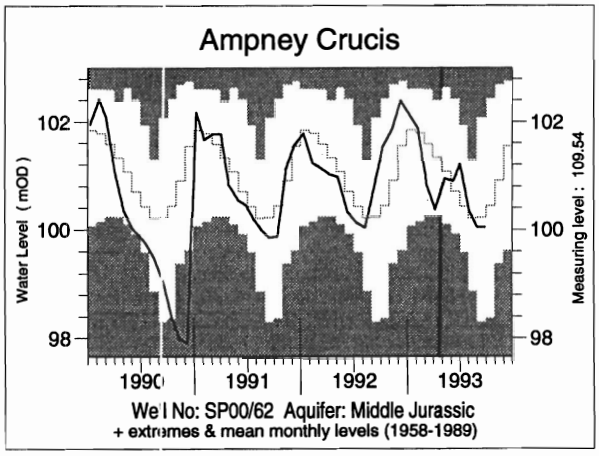


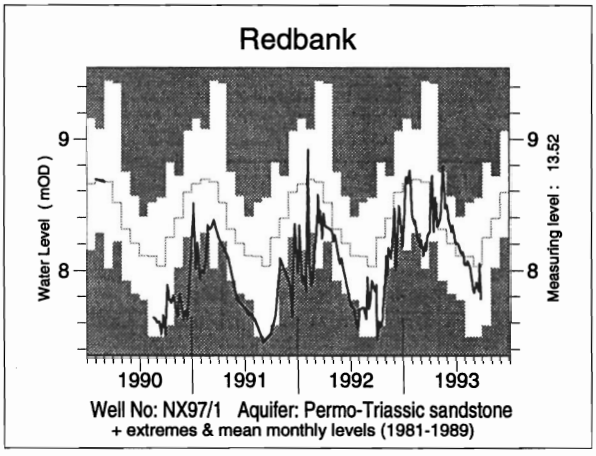


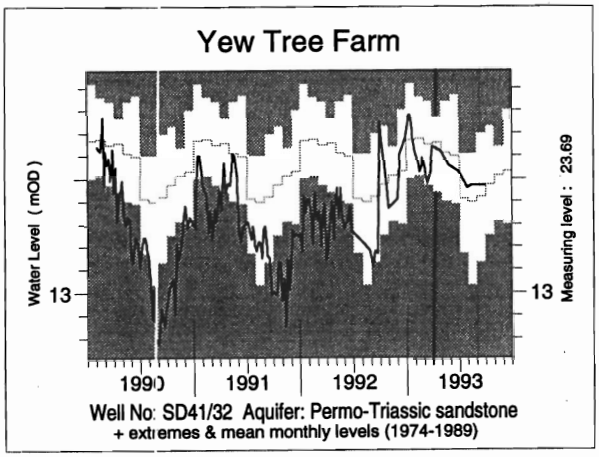


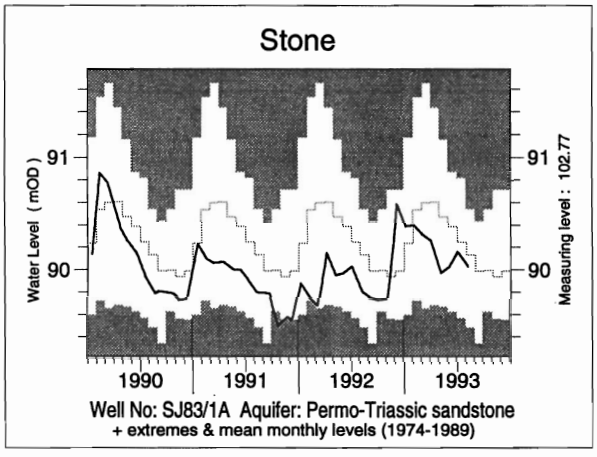

West Woodyates Manor
Water Level (mOD)
Measuring level : 110.88
1990
1991
1992
1993
Well No: SU01/5B Aquifer: Chalk and Upper Greensand
+ extremes & mean monthly levels (1942-1989)

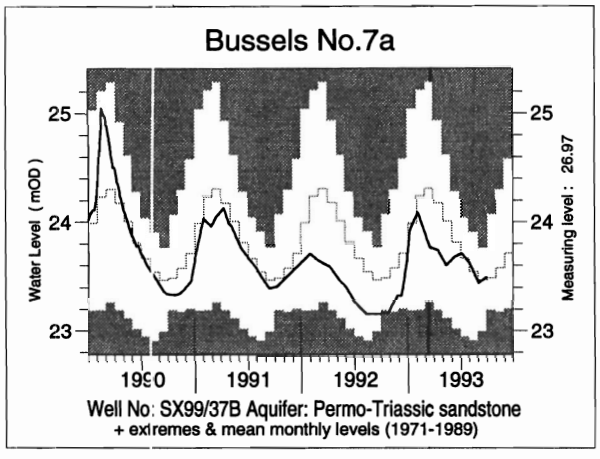

New Red Lion
Water Level (mOD)
Measuring level : 33.45
1990
1991
1992
1993
Well No: TF03/37 Aquifer: Lincolnshire Limestone
+ extremes & mean monthly levels (1964-1989)


Ampney Crucis
Water Level (mOD)
Measuring level : 109.54
1990
1991
1992
1993
Well No: SP00/62 Aquifer: Middle Jurassic
+ extremes & mean monthly levels (1958-1989)


Redbank
Water Level (mOD)
Measuring level : 13.52
1990
1991
1992
1993
Well No: NX97/1 Aquifer: Permo-Triassic sandstone
+ extremes & mean monthly levels (1981-1989)


Yew Tree Farm
Water Level (mOD)
Measuring level : 23.69
1990
1991
1992
1993
Well No: SD41/32 Aquifer: Permo-Triassic sandstone
+ extremes & mean monthly levels (1974-1989)


Stone
Water Level (mOD)
Measuring level : 102.77
1990
1991
1992
1993
Well No: SJ83/1A Aquifer: Permo-Triassic sandstone
+ extremes & mean monthly levels (1974-1989)


Bussels No.7a
Water Level (mOD)
Measuring level : 26.97
1990
1991
1992
1993
Well No: SX99/37B Aquifer: Permo-Triassic sandstone
+ extremes & mean monthly levels (1971-1989)

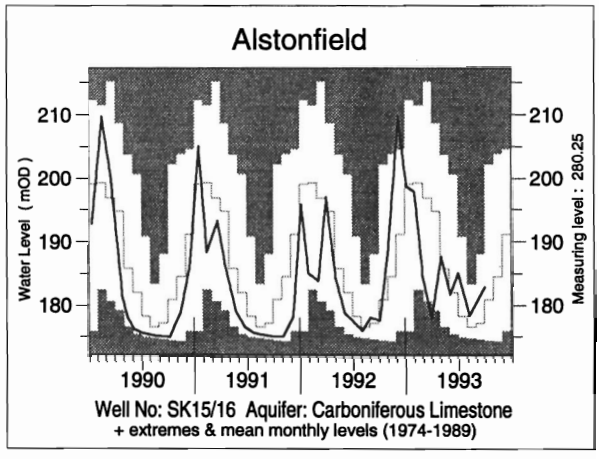

Alstonfield
Water Level (mOD)
Measuring level : 280.25
1990
1991
1992
1993
Well No: SK15/16 Aquifer: Carboniferous Limestone
+ extremes & mean monthly levels (1974-1989)

TABLE 5 A COMPARISON OF SEPTEMBER GROUNDWATER LEVELS: 1992 AND 1993

Site	Aquifer	Records commence	Average September level	September 1992		Sept/Oct 1993		No of years Sept level <1993	Lowest pre-1993 level
				day	level	day	level		any month
Wetwang	C & UGS	1971	19.52	25/09	17.91	28/09	20.12	>10	16.66
Dalton Holme	C & UGS	1889	15.67	25/09	10.98	20/09	14.08	>10	9.64
Little Brocklesby	C & UGS	1926	11.72	23/09	4.73	27/09	7.70	6	4.53
Washpit Farm	C & UGS	1950	43.98	01/09	40.49	06/10	42.73	9	40.30
The Holt	C & UGS	1964	87.23	01/09	84.38	26/09	88.73	>10	83.90
Therfield Rectory	C & UGS	1883	79.84	01/09	dry	26/09	77.40	>10	dry <71.6
Redlands Hall	C & UGS	1964	40.19	11/09	32.40	10/09	36.75	8	32.29
Rockley	C & UGS	1933	131.01	27/09	131.15	26/09	130.93	>10	dry <128.9
Little Bucket Farm	C & UGS	1971	64.89	21/09	60.29	04/10	61.03	4	56.77
Compton House	C & UGS	1894	33.05	24/09	30.51	29/09	31.45	>10	27.64
Chilgrove House	C & UGS	1836	41.20	24/09	37.89	29/09	38.87	>10	33.46
West Dean No 3	C & UGS	1940	1.46	28/09	1.47	24/09	1.59	>10	1.01
Lime Kiln Way	C & UGS	1969	125.02	09/09	123.85	08/09	124.10	1	123.70
Ashton Farm	C & UGS	1974	65.21	28/09	64.80	30/09	65.41	>10	63.10
West Woodyates	C & UGS	1942	72.81	28/09	74.50	30/09	72.90	>10	67.62
New Red Lion	LLst	1964	11.61	28/09	10.45	27/09	13.06	>10	3.29
Ampney Crucis	Mid Jur	1958	100.28	11/09	101.06	26/09	100.05	>10	97.38
Yew Tree Farm	PTS	1973	13.41	30/09	13.75	29/09	13.47	>10	8.43
Morris Dancers	PTS	1969	32.50	16/09	31.88	04/10	31.96	2	30.87
Stone	PTS	1974	90.07	04/09	89.75	04/10	90.06	>10	89.34
Skirwith	PTS	1978	130.05	14/09	129.77	28/09	130.02	8	129.44
Redbank	PTS	1981	7.97	26/09	7.84	26/09	7.78	5	7.45
Bussels 7A	PTS	1972	23.46	09/09	23.15	28/09	23.49	>10	22.90
Rushyford NE	MgLst	1967	71.83	27/09	74.49	08/10	75.94	>10	64.77
Peggy Ellerton	MgLst	1968	34.28	09/09	31.23	06/09	31.37	2	31.10
Alstonfield	CLst	1974	178.02	02/09	178.06	01/10	182.89	>10	174.22

groundwater levels are in metres above Ordnance Datum

C & UGS limestones	Chalk and Upper Greensand	Mid Jur	Middle Jurassic
LLst	Lincolnshire Limestone	MgLst	Magnesian Limestone
PTS	Permo-Triassic sandstones	CLst	Carboniferous
Limestone			

FIGURE 3 LOCATION MAP OF GAUGING STATIONS AND GROUNDWATER INDEX WELLS